



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Attorney Docket No.: 9896.149.0

CHAPPA, et al.

Application No.: 10/028,518

Examiner: Hai Vo

Filed: December 21, 2001

Group Art Unit: 1771

For: REAGENT AND METHOD FOR PROVIDING COATINGS ON SURFACES

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**AFFIDAVIT UNDER 37 CFR 1.132**

Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

State of Minnesota            )  
  )     S.S.  
County of Hennepin         )

Mr. Dale G. Swan, being first duly sworn, deposes and says:

1. I am Dale G. Swan. I am the first-named inventor on United States Patents 6,669,994, 6,077,698, and 5,414,075, which have been cited by the Examiner to reject the pending claims of the above-referenced patent application.

2. I am currently employed at SurModics, where I have worked for eighteen years. During my employment at SurModics, I have worked for about sixteen years on development, testing, and commercialization of polymeric coatings. I have also worked for about twelve years on development, testing, and commercialization of reagents usable in grafting polymers to surfaces and methods of using such reagents to cause polymerization of monomers to a surface through activation of these agents. I received a M.S. degree in Organic Chemistry from University of Minnesota in 1972. I received a B.A. degree in Chemistry from the Bethel College in 1963.

3. This affidavit is being submitted to explain the relevant differences between the subject matter claimed in this application and the cited art, and to explain that the grafting reagents having positively charged substituents, as disclosed in the present application, have significant differences when utilized in grafting processes than grafting reagents having negative charges as disclosed in the above referenced prior art.

4. During the development of grafting technology, grafting reagents with positively charged substituents were considered unusable, in part because persons of ordinary skill in the art recognized that the positively charged groups had the potential of eliciting a thrombogenic response when used in vivo in a blood related system. Because of the thrombogenicity issue, grafting agents with positively charged substituents are much different than those with negatively charged substituents and are generally not considered interchangeable. Grafting agents with positively charged substituents were also believed to be unusable because of poor solubility in certain aqueous systems. For at least these reasons, grafting reagents with positively charged substituents were not disclosed or considered in the application that resulted in United States Patent 6,669,994 for grafting reagents and were not considered usable at the time of that application by those skilled in the art.

5. We discovered that grafting agents with positively charged substituents could be used to graft polymers to surfaces for use in a blood related environment. Applicants found that the utilization of grafting agents with positively charged substituents provided better wetting of certain surfaces during the grafting process thereby creating more complete, thorough, and defect-free coverage of various surfaces to be coated. Furthermore, these grafting reagents were found to be usable because the positively charged substituents align the monomers prior to activation of the agents in such a way that a uniform coating is polymerized on the surface. Such a coating shields the positively charged substituent from the environment well enough that the thrombogenic effect of the substituent is substantially eliminated. The positively charged substituents unexpectedly aid in positioning the monomer molecules in position so that the initialized polymerization reactions result in uniform and smooth coatings that may be use in non-blood- and blood-related environments.

6. We also discovered that grafting agents with positively charged substituents were usable in applications where thrombogenicity is not a primary issue such as non-blood-related environments and short-term non-implantable applications. Also, there are applications such as endovascular graft coatings where the thrombogenic nature of the positively charged substituents have a heretofore unanticipated benefit.

7. At the time that I applied for United States Patents 5,414,075, 6,077,698, and 6,669,994, it was not expected that reagents with positively charged substituents would function adequately in a grafting process to graft polymerize monomers to a surface. The following research, which is the subject of the presently pending application, has shown the reagents with positively charges reagents have beneficial properties when utilized in a grafting process.

Dale G. Swan  
Dale G. Swan

Subscribed and sworn to before me  
this 11th day of August, 2005.

Patricia M. Best  
Notary Public

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